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Title of the Invention: External Preparation for Skin

Claims:

1. An external preparation for skin comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae.

2. An external preparation for skin as recited in claim 1 wherein the plant of the Genus Lepidium of the Family Cruciferae is Lepidium meyenii Walp.

3. A skin whitening agent comprising a plant extract as recited in claim 1 or 2 as an active agent.

4. A damaged skin repairing or preventing agent comprising a plant extract as recited in claim 1 or 2 as an active agent.

5. A moisturizer comprising a plant extract as recited in claim 1 or 2 as an active agent.

6. A moisturizer as recited in claim 6 which further contains at least one substance selected from the group consisting of polyhydric alcohols, mucopolysaccharides, saccharides, and amino acids.

7. A cosmetic formulation comprising at least one agent selected from the group consisting of a skin whitening agent, a damaged skin repairing or preventing agent and a moisturizer as recited in claims 3 to 6.

Detailed Description of the Invention

[0001] [Technical Field to Which the Invention Belongs]

This invention relates to an external preparation for skin and more particularly to an external preparation for skin exhibiting a skin whitening effect, a damaged skin-repairing or preventing effect, or a moisturizing effect. In another aspect, this invention relates to a novel use of an extract of a plant of the Genus Lepidium of the Family Cruciferae and in particular an extract of Lepidium meyenii Walp based on its newly found activity.

[0002] [Prior Art]

To an external preparation for skin which is used over a wide range of fields such as cosmetics, quasi drugs, and pharmaceutical formulations, many active ingredients have been added with the expectation of various effects such as whitening of skin, repair or prevention of damaged skin, and skin moisturization. Still now research is made night and day with the aim of finding or developing a novel ingredient having a higher efficacy.

[0003] The mechanism of development of chloasma (freckle) and fleck (ephelis) has not be completely elucidated, but is thought as follows. In melanin-producing granules (melanosomes) present in melanin cells (melanocytes) which are located between the cuticle and the corium, tyrosine which is a kind of amino acid becomes a dopaquinone by the action of an enzyme, tyrosinase, and the dopaquinone is transformed into melanin which is a blackish brown or reddish brown dye. In addition, the resulting melanin diffuses into adjacent cells by an osmosis phenomenon.

[0004] Accordingly, in order to prevent the formation of melanin which causes chloasma, it is effective to inhibit the activity of tyrosinase in the first stage of the above-described mechanism of melanin formation. From such a standpoint, various inhibitors of the activity of tyrosinase have been used in the past in the fields of cosmetics, quasi drugs, pharmaceutical formulations, and foods. In addition, novel tyrosinase activity-inhibitors are proposed in rapid sequence. They are represented by ascorbic acid, sulfurs, hydroquinone, kojic acid, and natural vegetable extracts. However, ascorbic acid has the problem of poor stability in the presence of water, and sulfurs have the problem of an offensive odor. Hydroquinone is disadvantageous in that it is highly toxic although its effect is significantly high. While kojic acid and natural vegetable extracts are highly safe, their tyrosinase inhibiting activities are weak, and many vegetable extracts have problems in odor, color, or the like.

[0005] On the other hand, with the aim of achieving an repairing or preventing effect on damaged skin, external preparations for skin have conventionally used ingredients having a moisturizing (moisturizer) activity such as various polyhydric alcohols such as glycerol, 1,3-butylene glycol, multitol, mannitol; polysaccharides such as hyaluronic acid, carboxymethylchitin; mucopolysaccharides such as chondroitin sulfate; or amino acids such as dl-threonine.

[0006] In recent years, in order to promote the so-called skin turnover which serve to accelerate the metabolism of skin, there has been an external preparation for skin to which a vitamin A derivative is added.

[0007] However, the moisturizer activity of each of the above-described ingredients such as polyhydric alcohols, polysaccharides, mucopolysaccharides, and amino acids is

of relatively short range, and it is not possible to attain sustained effect on repair or prevention of damaged skin. In addition, a skin external preparation produces tackiness and tingle when a polyhydric alcohol or mucopolysaccharide is added in a large amount, and it is pointed out that addition of an amino acid such as dl-threonine causes a skin external preparation to be colored or produce odor with time which may change. A vitamin A derivative has the problem that if it is applied to skin in the state that turnover is promoted too much as found in damaged skin with inflammation, and it has another problem in its stability in products.

[0008] [Problems which the Invention is to Solve]

Thus, it is an object of the present invention to provide an external preparation for skin having various useful effects such as whitening, repair or prevention of damaged skin, and moisturizing which are all desired in the fields of cosmetics, quasi drugs, and pharmaceutical formulations.

[0009] More specifically, one of the objects of the present invention is to provide a whitening agent which exhibits an effect of suppressing the production of melanin based on a tyrosinase activity-inhibiting activity and which is effective at preventing and repairing pigmentation, chloasma, and ephelides after sunburn.

[0010] Another object of the present invention is to provide a damaged skin-repairing or preventing agent which can be applied to even damaged skin with inflammation.

[0011] A still further object of the present invention is to provide a moisturizer which is effective for prevention and repair of damaged skin by providing the skin with adequate and sustained moisturization.

[0012] In recent years, as the social concern about the safety of cosmetics, quasi drugs, and pharmaceutical formulations which largely relate to health maintenance increases, there is a strong demand of their ingredients which are derived from naturally occurring substances of high safety and which do not adversely affect the product with respect to taste and odor.

[0013] The present invention is aimed at providing a formulation agent having the above-described functions and derived from a naturally occurring substance and an external preparation for skin containing such an agent which is safe for human bodies, all being able to respond to the above desire.

[0014] [Means for Solving the Problems]

The present inventors investigated the tyrosinase activity-inhibiting effect of a wide variety of substance in order to solve the above-described problems and contingently found that an extract of a plant belonging to the Genus Lepidium of the Family Cruciferae has an excellent tyrosinase activity-inhibiting effect. During further

investigation, they also found that in addition to the tyrosinase activity-inhibiting action, such extract is has a skin moisturzing effect which is significantly higher that known conventional moisturizers and is well sustained and that it has an excellent effect of impairing or preventing damaged skin, which can act to suppress the promotion of skin turnover so that it can be effectively used as a repairing agent for damaged skin with inflammation. The present invention has been developed based on these findings.

[0015] Thus, the present invention is an external preparation for skin set forth in 1 and 2 below:

1. An external preparation for skin comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae.

2. The above-described external preparation for skin wherein the plant of the Genus Lepidium of the Family Cruciferae is Lepidium meyenii Walp.

[0016] The above-described plant extract has a skin whitening effect, a damaged skin-repairing or preventing effect, and a skin moisturizing effect. Therefore, the present invention relates to a skin whitening agent in 3 below, a damaged skin-repairing or preventing agent in 4 below, and a moisturizer in 5 and 6 below.

3. A skin whitening agent comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae and particularly Lepidium meyenii Walp as an active agent. The efficacy of the skin whitening agent can be increased by further containing vitamin E.

4. A damaged skin repairing or preventing agent comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae and particularly Lepidium meyenii Walp as an active agent. The efficacy of the damaged skin repairing or preventing agent can be increased by further containing vitamin E.

5. A moisturizer comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae and particularly Lepidium meyenii Walp as an active agent.

6. The above-described moisturizer which further contains at least one substance selected from the group consisting of polyhydric alcohols, mucopoly-saccharides, saccharides, and amino acids, in addition to the plant of the Genus Lepidium of the Family Cruciferae.

[0017] Furthermore, the present invention is a cosmetic, quasi drug or pharmaceutical formulation comprising at least one agent selected from the group consisting of a skin whitening agent, a damaged skin repairing or preventing agent and a moisturizer as recited in 3 to 6 above.

[0018] [Embodiments of the Invention]

An external preparation for skin according to the present invention is

characterized by comprising an extract of a plant of the Genus Lepidium of the Family Cruciferae.

[0019] Plants of this kind are root vegetables which are native to or cultivated in the Andes area and particulary in highlands at an altitude of 4000 - 5000 meters in Peru. Among others, bulbs of Lepidium meyenii Walp have long been for eating.

[0020] An extract of a plant of the Genus Lepidium of the Family Cruciferae may be prepared using any portion of the Lepidium plant and preferably Lepidium meyenii Walp such as the whole body, flowers, fruitages, seeds, leaves, stems including stocks, and bulbs. Preferably it can be obtained by extracting bulbs with an extraction solvent.

[0021] The extracting solvent is not critical, and it is exemplified by water, a hydrophilic organic solvent, and a mixture of these.

[0022] The hydrophilic organic solvent specifically includes esters such as ethyl acetate, butyl acetate, and amyl acetate; ketones such as acetone, methyl ethyl ketone, and acetyl acetone,; lower alcohols such as methanol, ethanol, and butanol; and polyhydric alcohols such as propylene glycol and 1,3-butylene glycol. Preferably, it is an alcohol such as methanol, ethanol, propylene glycol, or 1,3-butylene glycol and more preferably it is ethanol or 1,3-butylene glycol.

[0023] These hydrophilic organic solvents may be used singly or two or more of these may be used with any combination. A mixed solvent of water and one or more hydrophilic organic solvents may also be used. In this case, the mixing ratio of a hydrophilic organic solvent to water is not critical, but it is usually exemplified by a ratio of 1:1 to 9:1 (weight ratio).

[0024] The extract of the Lepidium plant can specifically be prepared by immersing the bulb portions of the plant in the extraction solvent as it is or after drying and optionally cutting or pulverizing as required. The immersion treatment may be performed under refluxing and preferably under heating and refluxing. The resulting exudate fluid is filtered if necessary, and it may be directly used as an extract, or it may be concentrated to prepare a concentrated extract. In addition, if necessary, te resulting extract (including concentrated extract) may be purified using various columns such as an ion exchange column and partition column.

[0025] The proportion of a plant extract in a skin external preparation according to the present invention may usually be, for example, 0.001 - 10 wt% and preferably 0.0- - 5 wt% as dry matter (dry solids of the extract). It is not restricted that the plant extract is added in an amount exceeding 10 w%. However, since an increase in the effect which corresponds to an increase in the amount of the extract is not expected, an amount of up to 10 wt% is adequate from the standpoint of economy.

[0026] An external preparation for skin according to the present invention contains

at least the above-described essential ingredient, but, if necessary, may various additional ingredients which are conventionally used in external preparations for skin such as cosmetics, quasi drugs, and pharmaceutical formulations as long as they do not impair the effect of the invention.

[0027] Examples of such ingredients are various functional agents including skin whitening agents such as ascorbic acid and its derivatives, sulfur, kojic acid and its derivatives, glucosamine and its derivatives, glutathione, arnica extract, scutellaria root extract, mulberry bark extract, bupleurrum root extract, coix seed extract, marronnier (horse chestnut) extract, and oil-soluble glycyrrhiza extract (glycyrrhiza hydrophobic flavone, glabridin, glabrene, licochalcone A); moisturizers such as serine, glycine, alanine, collagen, hydrolyzed collagen, keratin, elastin, royal jelly, chondroitin heovaline, pectin, fermented bifidus acid, fermented lactic acid, yeast extract, jojoba oil, coix seed extract, rehmannia root extract, jujube extract, garden aloe extract, and burdock extract; cytotonic (cell actiavting) agents such as riboflavin or its derivatives, pyridoxine or its derivatives, nicotinic acid or its derivatives, pantothenic acid or its derivatives, alpha-tokopherol or its derivatives, carrot extract, eleutherococcus senticosus extract, loofah extract, alkanet root extract, betula extract, peony root extract, Sapindus mukurossi extract, safflower extract, and garlic extract; ultraviolet absorbers such as beta-isopropylfuranone, urocanic acid, oxybenzone, para-aminobenzoic acid, octyl methoxycinnamate, titanium oxide, beta-carotene, gamma-orizanol, aloe extract, rice bran extract, camomile extract, ginko, and hawthorn; antioxidants or active oxygen scavengers such as dibutylhydroxytoluene, propyl gallate, baicalin, baicalein, super oxide dismutase, catalase, rosemary extract, eriobotrya leaf extract, sage extract, eucalyptus extract, laurel extract, turmeric extract, nutmeg extract, thyme extract, hop extract, and vitamin E; antimicrobial or germicidal agents such as benzoic acid, sodium benzoate, benzethonium chloride, salicylic acid, sodium salicylate, sorbic acid, resorcin, bisbolol, hinokitiol, menthol, chitosan, plectranthus japonicus extract, eriobotrya extract, yucca extract, and aloe extract; anti-inflammatory or anti-allergic agents such as azulene, allantoin, aminocaproic acid, indomethacin, lysozyme chloride, glycyrrhizinic acid or its derivatives, glycyrrhezinic acid or its derivatives, tranexamic acid or its derivatives, perilla extract, coptis root extract, achillea milefolium extract, botree (linden) extract, artemisiae capillaris flos extract, artemisiae argyi forium extract, and gentian extract; and astringents such as citric acid or its salts, tartaric acid or its salts, aluminum chloride, aluminum sulfate, potassium sulfate, ju-extract (*transliterated*), hamamelis extract, geranium herb extract, artemisiae argyi forium extract, sage extract, marronnier extract, field horsetail (equisetum arvense) extract, and lemon balm extract.

[0028] An extract of the Genus Lepidium plant according to the present invention

has a tyrosinase activity-inhibiting effect as shown in Experiment 1 described below, and thus has an effect of suppressing the formation of melanin which causes pigmentation, chloasma, ephelides, and the like. Therefore, it can be formulated as a skin whitening agent in a skin preparation for external use such as cosmetics, quasi drugs, and pharmaceutical compositions.

[0029] A whitening agent according to the present invention may be comprised solely of an extract of the Genus Lepidium plant and preferably Lepidium meyenii Walp, but it may further comprise an antioxidant such as vitamin E or other ingredients having a skin whitening effect.

[0030] An extract of the Genus Lepidium plant according to the present invention has an effect of repairing or preventing damaged skin as shown in Experiment 2 described below, and it acts on skin with promoted turnover to suppress the turnover. Therefore, the Genus Lepidium plant extract can be formulated as a damaged skin repairing or preventing which can be applied to skin with inflammation by advanced skin damage in a skin preparation for external use such as cosmetics, quasi drugs, and pharmaceutical compositions.

[0031] A damaged skin repairing and preventing agent according to the present invention may be comprised solely of an extract of the Genus Lepidium plant and preferably Lepidium meyenii Walp, but it may further comprise one or more ingredients such as an antioxidant such as vitamin E, a moisturizer, or other ingredients having a damaged skin repairing or preventing effect.

[0032] In addition, an extract of the Genus Lepidium plant according to the present invention has a moisturizing activity as shown in Experiment 3 described below, and its moisturizing activity is significantly more sustained than known conventional moisturizers such as polyhydric alcohols such as glycerine. Therefore, the Genus Lepidium plant extract can be usefully formulated as a moisturizer in a skin preparation for external use such as cosmetics, quasi drugs, and pharmaceutical compositions.

[0033] A moisturizer according to the present invention may be comprised solely of an extract of the Genus Lepidium plant and preferably Lepidium meyenii Walp, but in view of enhancing and extending its moisturizer effect, it may further comprise at least one of a polyhydric alcohol, a mucopolysaccharide, or an amino acid.

[0034] The polyhydric alcohol is not critical insofar as the desired effect of the present invention can be achieved, but it can be exemplified by glycerol, 1,3-butylene glycol, propylene glycol, and polyglycerol,. The mucopolysaccharide is not critical insofar as the desired effect of the present invention can be achieved, but it can be exemplified by hyaluronic acid, chondroitin sulfate, dermatan sulfate, keratan sulfate, and heparin or its salts. The saccharide is not critical insofar as the desired effect of the

present invention can be achieved, but it can be exemplified by sorbitol, xylitol, mannitol, maltitol, sucrose, glucose, lactose, and saccharose. The amino acid is not critical insofar as the desired effect of the present invention can be achieved, but it can be exemplified by amnino acids such as L-aspartic acid, DL-alanine, glycine, L-threonine, L-methionine, L-arginine, as well as amino acid derivatives such as pyrrolidonecarboxylic acid (5-oxoproline).

[0035] The proportions of these ingredients relative to the Genus Lepidium plant extract is not critical and can be adjusted appropriately depending on the intended product. However, the following proportions may be referenced to.

[0036] In the case of a polyhydric alcohol, 0.01 - 10 parts by weight based on 1 part by weight of the Genus Lepidium plant extract (as a dry weight); in the case of a mucopolysaccharide, 0.001 - 5 parts by weight based on 1 part by weight of the Genus Lepidium plant extract (as a dry weight); in the case of a saccharide, 0.01 - 10 parts by weight based on 1 part by weight of the Genus Lepidium plant extract (as a dry weight); and in the case of an amino acid, 0.01 - 10 parts by weight based on 1 part by weight of the Genus Lepidium plant extract (as a dry weight).

[0037] The proportions of these ingredients relative to external preparations for skin such as cosmetics, quasi drugs, or pharmaceutical formulations based on 100 wt% of the external preparations for skin are as follows: polyhydric alcohol 0.1 - 70 wt%, preferably 1 - 50 wt%; mucopolysaccharide 0.0001- 5 wt%, preferably 0.001 - 1 wt%; saccharide 0.1 - 50 wt%, preferably 1 - 20 wt%; and amino acid 0.01 - 3 wt%, preferably 0.05 - 2 wt%.

[0038] The present invention is an external preparation for skin (cosmetic, quasi drug, or pharmaceutical formulation) and preferably a cosmetic comprising an extract of the Genus Lepidium plant and preferably Lepidium meyenii Walp in the above-described proportion as one of various functional ingredients such as skin whitening agents, damaged skin impairing or preventing agent, and moisturizer.

[0039] The external preparation for skin according to the present invention may further contain, in addition to the above-described active ingredient and functional agents, various additives which are conventionally added to cosmetic or external preparations such as fats and oils, waxes, hydrocarbons, fatty acids, esters, surfactants, preserves, antioxidants, UV absorbers, aromatics, water, alcohols, thickeners, and colorants, depending on its product form.

[0040] Examples of fats and oils include soybean oil, linseed oil, tung oil, sesame oil, safflower oil, cone oil, almond oil, coconut oil, castor oil, rapeseed oil, and olive oil; examples of waxes include carnauba wax, beeswax, cetaceum, shellacs (or serax, transliterated), and lanolin; examples of hydrocarbons include liquid petrolatum,

vaseline, secilen, and squalane; examples of fatty acids include stearic acid, linolic acid, oleic acid, lanolic acid, myristic acid, palmitic acid, behenic acid, and undecylenic acid; examples of alcohols include lauryl alcohol, cetyl alcohol, stearyl alcohol, oleyl alcohol, glycerol, propyl alcohol, 1,3-butylene glycol, ethylene glycol, cholesterol, and phytosterol; examples of esters include decyl oleate, butyl stearate, myristyl myristate, propylene glycol monostearate, lanolin acetate, glycerol trimyristate, and propylene glycol dioleate; examples of surfactants include various anionic, cationic, amphoteric and nonionic surface active agents: and example of aromatics include menthol, carvone, eugenol, anethole, mentha oil, spearmint oil, peppermint oil, eucalyptus oil, and anise oil. These are mere examples and the present invention is not limited to them.

[0041] The formulation form of an external preparation for skin according to the present invention is not critical, and it can be formulated in a conventional manner into various forms for cosmetics such as emulsion, lotion, cream, jelly, pack, makeup cosmetics; or into various quasi drug and drug forms such as ointment, cream, liquid, poultices, powders, skin cleansing products such as soap, rinse, and baths.

[0042] [Examples]

The following preparations, experiments and examples are given to specifically illustrate the present invention. The examples and the like are intended for mere illustration, and the present invention is not restricted to them in any manner. In the examples, % means % by weight unless otherwise indicated/

Preparation 1: Extract of Lepidium meyenii Walp with water

100 grams of bulbs of Lepidium meyenii Walp (dry powder) was extracted by immersing it for 2 hours in water (70 C), and the resulting exudate fluid was filtered and then concentrated in vacuum to obtain 18.6 grams of Lepidium meyenii Walp extract (dry solid).

[0043] Preparation 2: Extract of Lepidium meyenii Walp with ethanol

100 grams of bulbs of Lepidium meyenii Walp (dry powder) was extracted by immersing it for 2 weeks in 500 ml of ethanol (room temperature). The resulting exudate fluid was filtered, and the filtrate was concentrated in vacuum to obtain 8.5 grams of Lepidium meyenii Walp extract (dry solid).

[0044] Preparation 3: Extract of Lepidium meyenii Walp with 50% aqueous ethanol

100 grams of bulbs of Lepidium meyenii Walp (dry powder) was extracted by immersing it for 2 weeks in 500 ml of an aqueous 50% ethanol solution (room temperature). The resulting exudate fluid was filtered and then concentrated in vacuum to obtain 12.3 grams of Lepidium meyenii Walp extract (dry solid).

[0045] Preparation 4: Extract of Lepidium meyenii Walp with 1,3-butylene glycol

100 grams of bulbs of Lepidium meyenii Walp (dry powder) was extracted

by immersing it for 2 hours in 500 ml of 1,3-butylene glycol at 70 C. The resulting exudate fluid was filtered, and the filtrate was concentrated in vacuum to obtain 5.8 grams of Lepidium meyenii Walp extract (dry solid).

Preparation 5: Extract of Lepidium meyenii Walp with 50% aqueous 1,3-butylene glycol

100 grams of bulbs of Lepidium meyenii Walp (dry powder) was extracted by immersing it for 2 hours in 500 ml of an aqueous 50% 1,3-butylene glycol solution at 70 C. The resulting exudate fluid was filtered, and the filtrate was concentrated in vacuum to obtain 6.4 grams of Lepidium meyenii Walp extract (dry solid).

[0046] <Experiments>

Experiment 1

Each of the Lepidium meyenii Walp extracts prepared in the above-described Preparations 1 - 5 was used as a test sample to measure its tyrosinase activity-inhibiting effect by the following method.

(1) Method of measuring tyrosinase inhibiting activity

0.7 ml of a tyrosinase solution (60 unit/ml), 1.8 ml of a 1/15M phosphate buffer solution (pH 6.8), and 0.5 mk of a 0.05% tyrosine solution to which a test sample has been added are thoroughly mixed, and the mixture is used as a reaction solution (a total of 3 ml) and is allowed to react for 1 hour at 37 C. The absorbance A of the reacted solution at 475 nm is measured. The value of absorbance A is proportional to the concentrations of a group of colored components such as melanin which are formed from tyrosine by the action of tyrosinase. As a control, the above reaction system is allowed to react in the same manner except that a test sample is not added to the tyrosine solution, and the absorbance B of the reacted solution at 475 nm is measured. The % inhibition of tyrosinase activity is calculated by the following equation:

[0047] % Inhibition = (1 - A/B) x 100

The above % inhibition is measured with stepwise change of the concentration of the test sample (micrograms/milliliter of reaction solution), and the concentration of the test sample at which % inhibition becomes 50% is determined by interpolation and is taken as IC_{50}.

(2) Test results

The results are shown in Table 1. As controls, the test results obtained in the same manner except that an Lepidium meyenii Walp (LMW) extract was replaced by water (Control 1) or ethanol (Control 2) are also shown therein.

[0048]

[Table 1]

Test sample	IC50 (ug/ml)
Preparation 1: LMW extract with water	150
Preparation 2: LMW extract with ethanol	65
Preparation 3: LMW extract with water/ethanol (1:1)	104
Preparation 4: LMW extract with 1,3-butylene glycol	75
Preparation 5: LMW extract with water/1,3-butylene glycol (1:1)	80
Contorl 1: Water	at least 2000
Control 2: Ethanol	at least 2000

[0049] From the results shown in Table 1, it was found that each of the extracts of Lepidium meyenii Walp (LMW) with various solvents had an inhibitory activity of tyrosinase activity. This fact suggests that an extract of the Genus Lepidium plant according to the present invention exhibits an effect of suppressing the formation of melanin based on its tyrosinase activity-inhibiting effect, namely, a skin whitening effect which is useful for preventing and repairing pigmentation, chloasma, ephelides, and the like.

[0050] Experiment 2

Each of the Lepidium meyenii Walp extracts prepared in the above-described Preparations 1 - 5 was studied about (1) damaged skin preventing effect and (2) suppressive effect on the promotion of skin turnover due to inflammation by skin damage in accordance with the following methods.

(1) Damaged skin preventing activity

The back skin of each Hartley albino guinea pig was sheared and shaved, and to an area of the back skin having a diameter of 2 cm and located symmetrically about the midline, 30 microliters of an aqueous 3% sodium dodecyl sulfate solution was open applied daily for three consecutive days. After the application and on the second day, a Lepidium meyenii Walp extract (Preparations 1 - 5) prepared in the form of an aqueous 1% suspension was open applied. After one week, the degrees of skin damage and erythema were determined based on the criterion shown belo (in Table 2). Additional tests were carried out in the same way using water in place of a Lepidium meyenii Walp extract as a control experiment or using an aqueous 1% glycerol solution or a 1% vitamin A solution in ethanol in place of a Lepidium meyenii Walp extract as comparative experiments.

[0051] [Table 2]

<Criterion for Evaluation>

Score	Description
1	desquamation with significant erythema is observed
2	desquamation with moderate erythema is observed
3	mild desquamation with weak erythema is observed
4	mild desquamation with no erythema is observed
5	little desquamation or erythema is observed

[0052] The results are also shown in Table 2.

[0053] (2) Suppressive effect on the promotion of skin turnover accompanying inflammation by skin damage

The back skin of each Hartley albino guinea pig was sheared and shaved, and to an area of the back skin having a diameter of 2 cm and located symmetrically about the midline, 30 microliters of an aqueous 3% sodium dodecyl sulfate solution was open applied daily for three consecutive days. Thereafter, to the applied area a dansyl chloride-containing ointment was applied by obturated application for 1 day, and from the next day, open application of a Lepidium meyenii Walp extract (Preparations 1 - 5) prepared in the form of an aqueous 1% suspension was performed daily with everyday measurement of the fluorescence intensity of dansyl chloride applied to the skin. The number of days which elapsed until the fluorescence disappeared was determined and taken as the skin turnover days. Additional tests were carried out in the same way using water in place of a Lepidium meyenii Walp extract as a control experiment or using an aqueous 1% glycerol solution (Comparative Example 1) or a 1% vitamin A solution in ethanol (Comparative Example 2) in place of a Lepidium meyenii Walp extract as comparative experiments. The results are shown in Table 3.

[0054] [Table 3]

Test sample	score on damaged skin	days to turnover
Normal skin	5	15.3
Preparation 1: extract with water	4	10.3
Preparation 2: extract with water	5	13.5
Preparation 3: extract with water/ethanol (1:1)	5	12.5
Preparation 4: extract with 1,3-butylene glycol	5	13.9
Preparation 5: extract with water/1,3-butylene glycol (1:1)	5	14.1
Control: water	1	6.3
Comparative 1: 1% glycerol	3	7.3
Comparative 2: 1% vitamin A	5	5.2

[0055] As can be seen from the results shown in Table 3, the Lepidium meyenii Walp extracts according to the present invention exhibit an excellent effect on prevention or repair of damaged skin and has a suppressive effect on the promotion of skin turnover.

[0056] Skin external preparations (in cream form) having the formulations shown in Table 4 (Examples 1 and 2) were prepared and tested for the moisturizing effect of such creams in the following manner. In addition, as comparative examples, the same formulations as Examples 1 and 2 except that the Lepidium meyenii Walp extract was removed were tested for the moisturizing effect in the same manner. Specifically, the test was performed as follows.

(1) Method for preparation of skin formulation for external use (cream)

An oil phase (liquid petrolatum, solid paraffin, olive oil, cetanol, and self-emulsifiable glycerol monostearate) and an aqueous phase (polyoxyethylene glycerol monostearate (20 E.O.), methyl paraoxybenzoate, a Lepidium meyenii Walp extract, glycerol, and purified water) were separately dissolved at 75 C until homogeneous mixtures were obtained. Then, the aqueous phase was added to the dissolved oil phase, and the mixture was thoroughly stirred and then cooled to 30 C to prepare a skin formulation for external use in cream form according to the present invention (Examples 1 and 2). As comparative formulations, comparative creams (Comparative Examples 1 and 2) were prepared in the same manner as described above except that the Lepidium meyenii Walp extract was eliminated from the water phase composition.

[0057] (2) Evaluation of moisturizing effect

The evaluation of a skin preparation for external use according to the present invention was carried out using SKIN SURFACE HYDROMETER IB-35 (manufactured by IBS). Specifically, 0.3 grams of each test sample of the skin external preparations according to the present invention and of comparative examples was daily applied to the upper arm of six healthy subjects having healthy skin for 30 days, and the value of conductance (in micromho) of the treated skin was measured before and after the initial application (on day 1), 2 and 8 hours after the initial application, and before the application on day 3, day 7, day 15, and day 30 using the above-described instrument. The measurement was carried out under the conditions of room temperature (20 C) and humidity (65%), and the evaluation was made by the average of the measured values of the six subjects. The results are also shown in Table 4.

[0058] [Table 4]

			Example (%)		Compar. Example (%)	
			1	2	1	2
Liquid petrolatum			11.0	11.0	11.0	11.0
Solid paraffin			4.0	4.0	4.0	4.0
Olive oil			1.5	1.5	1.5	1.5
Cetanol			3.0	3.0	3.0	3.0
Self-emulsifiable glycerol monostearate			3.0	3.0	3.0	3.0
glycerol POE20 monostearate			2.0	2.0	2.0	2.0
Methyl p-oxybenzoate			0.2	0.2	0.2	0.2
Lepidium meyenii Walp extract (Preparation 3)			5.0	5.0	---	---
Glycerol			---	20.0	---	20.0
Purified water			remainder	remainder	remainder	remainder
Total			100.0	100.0	100.0	100.0
Evaluation	day 1	Before application	68	63	62	61
		After applicaiton	174	398	141	405
		After 2 hours	160	299	97	225
		After 8 hours	115	249	60	195
	day 3		120	201	62	114
	day 7		122	221	61	111
	day 15		120	223	64	64
	day 30		125	233	68	76

[0059] As can be seen from the results shown in Table 4, incorporation of glycerol which is a polyhydric alcohol (Comparative Example 2) gave an increase in skin moisturization over a similar formulation without glycerol (Comparative Example 1), but its effect decreased soon and was not sustained. In contrast, a cream containing a Lepidium meyenii Walp extract according to the present invention (Example 1) had a long lasting, high moisturizing effect. The moisturizing effect was potentiated by the cream in which a polyhydric alcohol (glycerol) was incorporated in addition to a Lepidium meyenii Walp extract (Example 2, and its strong moisturizer effect was sustained for a long period.

[0060] In addition, when each of hyaluronic acid (a mucopolysaccharide), and sorbitol (a saccharide), L-aspartic acid (an amino acid) was used together with a Lepidium meyenii Walp extract to test an agent other than glycerol, the moisturizer

effect of a Lepidium meyenii Walp extract was similarly potentiated, and its effect was sustained for a prolonged period.

[0061]

Example 3: Lotion

the Lepidium meyenii Walp extract of Example 3	0.15 (%)
glycerol	4.00
1,3-butylene glycol	4.00
ethanol	7.00
polyoxyethylene oleyl alcohol	0.50
methylparaben	0.05
citric acid	0.01
sodium citrate	0.10
aromatic	0.05
purified water	remainder
Total	100.00 (%)

[0062]

Example 4: Lotion

the Lepidium meyenii Walp extract of Example 1	5.0 (%)
polyoxyethylene hardened castor oil (60 E.O.)	0.5
glycerol	10.0
1,3-butylene glycol	5.0
ethanol	7.0
methyl paraoxybenzoagel	0.2
sodium hyaluronate	0.2
aromatic	0.1
purified water	remainder
Total	100.0 (%)

[0063]

Example 5: Cream

the Lepidium meyenii Walp extract of Example 3	5.0 (%)
stearic acid	2.0
stearyl alcohol	7.0
reduced lanolin	2.0
squalane	5.0
octyldodecanol	6.0
polyoxyethylene cetyl ether	3.0
glycerol monostearate	2.0

aromatic	0.1
preservative, antioxidant	0.1
propylene glycol	5.0
purified water	remainder
Total	100.00 (%)

The above formulation was homogenized in a conventional manner for preparing a cream, and a skin external preparation (neutral cream) according to the present invention was prepared.

[0064]

Example 6: Cream

the Lepidium meyenii Walp extract of Example 5	1.0 (%)
cetostearyl alcohol	3.5
beeswax	40.0
squalane	3.0
reduced lanolin	5.0
ethylparaben	0.3
(20) acid [sic]	2.0
stearic acid monoglyceride	2.0
1,3-butylene glycol	5.0
glycerol	5.0
aromatic	0.03
purified water	remainder
Total	100.00 (%)

The above formulation was homogenized in a conventional manner for preparing a cream, and a skin external preparation (neutral cream) according to the present invention was prepared.

[0065]

Example 7: Cream

the Lepidium meyenii Walp extract of Example 4	5.0 (%)
1,3-butylene glycol	7.0
concentrated glycerol	6.0
L-arginine 0.2	
sodium chondroitin sulfate	0.02
squalane	10.0
isopropyl palmitate	5.0
cetanol	2.0
polyoxyethylene(20 E.O.) stearyl alcohol	1.0

triethanolamine	0.5
stearic acid	0.5
oleophilic glyceryl monostearate	0.5
methyl paraoxybenzoate	0.2
propyl paraoxybenzoate	0.2
sodium pyrrolidone carboxylate	2.0
aromatic	0.1
purified water	remainder
Total	100.00 (%)

[0066]

Example 8: Lotion

the Lepidium meyenii Walp extract of Example 5	5.0 (%)
stearic acid	2.0
cetanol	1.5
vaseline (petrolatum) 3.0	
lanolin alcohol	2.0
liquid petrolatum	10.0
polyoxyethylene monooleate	2.0
aromatic	0.1
preservative, antioxidant	0.1
glycerol	3.0
propylene glycol	5.0
triethanolamine	1.0
purified water	remainder
Total	100.00 (%)

The above formulation was homogenized in a conventional manner for preparing a lotion, and a skin external preparation (lotion) according to the present invention was prepared.

[0067]

Example 9: Emulsion

the Lepidium meyenii Walp extract of Example 2	0.01(%)
stearic acid monoglyceride	0.50
cetyl alcohol	0.50
beeswax	2.00
polyoxyethylene(10) monooleate	1.00
glycerol monostearate	1.00
quince seed extract (aqueous 5% solution)	20.00

propylene glycol	5.00
ethanol	3.00
ethylparaben	0.30
aromatic	0.03
purified water	remainder
Total	100.00 (%)

Example 10: Emulsioin

the Lepidium meyenii Walp extract of Example 3	5.0 (%)
polyethylene glycol	4.0
glycerol	4.0
carboxy polymer	0.2
cetyl alcohol	0.5
stearic acid	1.5
triethaolamine	0.5
self-emusifiable glycerol monostearate	1.5
polyoxyethylene sorbitan (20 E.O.) monostearate	0.7
olive oil	5.0
squalane	3.0
aromatic	0.1
purified water	remainder
Total	100.00 (%)

Example 11: Essence

the Lepidium meyenii Walp extract of Example 3	5.0 (%)
polyoxyethylene hardended castor oil (60E.O.)	0.5
dl-tocopherol acetate	0.2
ethanol	7.0
methyl paraoxybenzoate	0.2
glycerol	8.0
propylene glycol	3.0
sodium hyaluronate	0.3
purified water	remainder
Total	100.00 (%)

Example 8: Lotion

the Lepidium meyenii Walp extract of Example 5	5.0 (%)
stearic acid	2.0
cetanol	1.5
vaseline (petrolatum) 3.0	

lanolin alcohol	2.0
liquid petrolatum	10.0
polyoxyethylene monooleate	2.0
aromatic	0.1
preservative, antioxidant	0.1
glycerol	3.0
propylene glycol	5.0
triethanolamine	1.0
purified water	remainder
Total	100.00 (%)

[0068]

Example 13: Pack

the Lepidium meyenii Walp extract of Example 4	5 (%)
polyvinyl alcohol	15
polyethylene glycol	3
propylene glycol	7
ethanol	10
methylparaben	0.05
aromatic	0.05
1,3-butylene glycol	5
purified water	remainder
Total	100.0 (%)

The above ingredients were emulsified in a conventional manner for the preparation of emulsions to produce a skin preparation for external use (pack) according to the present invention.

[0069]

Example 14: Pack

the Lepidium meyenii Walp extract of Example 4	5.0 (%)
polyvinyl alcohol	15.00
polyethylene glycol	3.00
propylene glycol	7.00
ethanol	10.00
methylparaben	0.05
1,3-butylene glycol	5.00
aromatic	0.05
purified water	remainder
Total	100.00 (%)

Example 15: Pack

the Lepidium meyenii Walp extract of Example 3	5.0 (%)
1,3-butylene glycol	10.0
propylene glycol 4000	2.0
glycerol	8.0
ethanol	11.0
polyvinyl alcohol	12.0
squalane	0.3
sodium dl-pyrrolidone carboxylate	1.0
citric acid	0.3
cholesteryl 1,3-hydroxystearate	1.0
polyether-modified silicone	1.0
aromatic	0.1
purified water	remainder
Total	100.00 (%)

Example 16: Facial cleansing cream

the Lepidium meyenii Walp extract of Example 3	5 (%)
stearic acid	18
palmitic acid	12
myristic acid	15
lauric acid 5	
oleyl alcohol	4
polyoxyethylene reduced lanolin	2
aromatic	0.1
methylparaben	0.1
concentrated glycerol 15	
potassium hydroxide	8
Total	100.0 (%)

The above formulation was emulsified in a conventional manner to produce a skin preparation for external use (facial cleansing cream) according to the present invention.

[0070]

Example 17: Facial cleansing cream

the Lepidium meyenii Walp extract of Example 4	5 (%)
stearic acid	19
palmitic acid	13
myristic acid	12

lauric acid	6	
oleyl alcohol		4
polyoxyethylene reduced lanolin		2
aromatic		0.3
methyl paraoxybenzoate		0.2
concentrated glycerol	20	
potassium hydroxide		7
purified water		remainder
Total		100.0 (%)

Example 18: Bath additive

the Lepidium meyenii Walp extract of Example 3	5.0%)
exsiccated sodium sulfate	70.0
sodium carbonate	20.0
sodium chloride	4.0
hyaluronic acid	0.01
aromatic	0.99
Total	100.00 (%)

[0071]

An external preparation for skin according to the present invention has an excellent tyrosinase activity-inhibiting effect due to the presence of an extract of a plant belonging to the Genus Lepidium of the Family Cruciferae, particularly the plant Lepidium meyenii Walp, and it is effective at diluting pigmentation after sunburn, chloasma, ephelides, and liver spots and at skin whitening. It is also effective in skin moisturization due to its excellent moisturizing ability, thereby preventing or repairing damaged skin. For these effects (skin whitening, moisturizing, and repair and prevention of damaged skin), an external preparation for skin according to the present invention is useful for cosmetics, quasi drugs, and medicaments for external use.